Claims

1. Network, especially PROFIBUS PA network, with redundancy properties, with the topology of the network (11) featuring a line (H1...H5) and the two line ends (E1, E2) being connected to redundancy manager part (RM) which is embodied, in the error-free case to disconnect the two line ends (E1, E2) from each other and in the event of an error, to connect the two line ends (E1, E2) to each other, characterized in that the redundancy manager (RM) is embodied such that a feed voltage can be fed into one of the line ends (E1, E2) a feed voltage for operation of user devices (F1...F4) each connected by a branching unit (T1...T4) to the network (11), that the branching units (T1...T4) are inserted into a network lines in each case such that a first cable end of the network line is connected to a first network connection (NW1) of the branching unit (e.g. T1) and a second cable end of a network line to a second network connection (NW2) of the branching unit (T1), that each branching unit (T1...T4) is embodied so that after receiving a feed voltage at one of its network connections (NW1, NW2) the state of the cable connected to the other network connection in each case can be tested and that the feed voltage can only be forwarded on this cable in the fault-free state, and that the redundancy manager (RM) is further embodied such that a feed voltage can also be injected into the other of the line ends (E1, E2) if at least one predetermine period after injection of the feed voltage into the one line end no feed voltage is detectable at the other line end by the redundancy manager (RM).

2. Network in accordance with claim 1, characterized in that the redundancy manager (RM) and the branching unit (T1...T4) each feature a termination element (BT1, BT2, BT) which can be connected in the case in which in the relevant network

topology they are located at the end of a line.

3. Network in accordance with claim 1 or 2, characterized in that at least one, especially each of the branching unit (e.g. T1) is provided with two switches (S1, S2) and with a control unit (ST), with the two switches (S1, S2) being able to be set by the control unit (ST) such that the user device (F1) connected with the relevant branching unit (T1) to the network (11) can be through connected to the one, to the other or to both network connections (NW1, NW2) of the branching unit (T1) to obtain operating energy and for data transmission.

4. Network in accordance with claim 3, characterized in that the branching unit (e.g. T1) features a resistor network (R0, R1, R2), in which the switches (S1, S2) are arranged, and that the switches (S1, S2) can be set by the control unit (ST) such that current (I1, I2) and/or voltage (U1, U2) of the cables (H1, H2) connected to the one or the other network connection (NW1, NW2) of the branching unit (T1) can be checked by the control unit (ST).

5. Network in accordance with on of the previous claims, characterized in that at least one, especially each of the branching units (e.g. T1) features an energy accumulator (C) which at least in the error-free state can be charged up by the feed voltage, and that the branching unit (T1) is embodied in each case to record the voltage present at the connected user device (F1) and in the case of a voltage deficit, to connect the energy accumulator (C) to the user device (F1).

6. Network in accordance with on of the previous claims, characterized in that the redundancy manager (RM) features means (RMCB) which record the timing of the voltage and/or of the current at the one line end (E1) during the forwarding of the feed voltage by the individual branching units (T1...T4)

and from this determine the number of branching units (T2, T1) up to an error location (12).

7. Network in accordance with on of the previous claims, characterized in that the redundancy manager (RM) features means (RMCB) which record changes in the voltage and/or the current at least one of the two line ends (E1, E2) and from this determine state transitions of the network (11).

8. Branching unit for a user device (F1...F4) in a network (11), especially a PROFIBUS PA network, with redundancy properties, with the topology of the network (11) featuring a line (H1...H5) and the two line ends (E1, E2) being connected to the redundancy manager (RM) which is embodied, in the error-free case to disconnect the two line ends (E1, E2) from each other and in the event of an error to connect the two line ends (E1, E2) to each other, characterized in that, the branching unit (e.g. T1) can be inserted into the network line in such a way that a first cable end of the network line can be connected to a first network connection (NW1) of the branching unit (T1) and a second cable end of the network line to a second network connection (NW2) of the branching unit (T1) and that the branching unit (T1) is embodied such that, after receiving a feed voltage at its one network connection (NW1) the state of the cable (H2) connected to the other network connection (NW2) can be checked in each case and that the feed voltage can only be forwarded for an error-free state on this cable (H2).

9. Branching unit in accordance with claim 8, characterized in that it is provided with two switches (S1, S2) and with a control unit (ST), with the two switches (S1, S2) being able to be set by the control unit (ST) such that the user device (F1) connected with the relevant branching unit (e.g. T1) to

the network (11) can be through connected to the first, to the second or to both network connections (NW1, NW2) of the branching unit (T1) to receive operating energy and for data transmission.

10. Branching unit in accordance with claim 9, characterized in that it features a resistor network (R0, R1, R2), in which the switches (S1, S2) are arranged, and that the switches (S1, S2) can be set by the control unit (ST) such that current (I1, I2) and/or voltage (U1, U2) of the cable (H1, H2) connected to the one or the other network connection (NW1, NW2) of the branching unit (T1) is able to be checked with the control unit.

11. Branching unit in accordance with one of the claims 8 to 10, characterized in that it features an energy accumulator (C) which can be charged up at least in the error-free state of the feed voltage and that the branching unit (e.g. T1) is embodied to record the voltage (U3) present at the relevant user device (F1) connected in each case and in the case of a voltage deficit, to connect the energy accumulator (C) to the user device (F1).

12. Branching unit in accordance with one of the claims 8 to 11, characterized in that the network connections (NW1, NW2) are able to be fixed in a predetermined electrical state for performing maintenance and/or repair work.

13. Redundancy manager for a network (11), especially a PROFIBUS PA network, with redundancy properties, with the topology of the network (11) featuring a line (H1...H5) and the two line ends (E1, E2) being connected to the redundancy manager (RM) which is embodied, in the error-free case, to disconnect the two line ends (E1, E2) from each other and in the event of an error to connect the two line ends (E1, E2) to

each other, characterized in that the redundancy manager (RM) is embodied so that a feed voltage for operation of user devices (F1...F4) connected in each case with a branching unit (T1...T4) to the network (11) can be injected into one of the line ends (E1, E2) and that a feed voltage can also be injected into the other of the line ends (E1, E2) if at least a predetermined time after injection of the feed voltage into the one line end no feed voltage is detectable at the other line end by the redundancy manager (RM).

14. Redundancy manager in accordance with claim 13, characterized in that it features means (RMCB) which record the timing of the voltage and/or the current at the one line end (E1) during the forwarding of the feed voltage by the individual branching units (T1...T4), and from this determine the number of branching units (T2, T1) up to an error location (12).

15. Redundancy manager in accordance with claim 13 or 14, characterized in that it has a communication interface (RMI) for connection and exchange of data with a higher-ranking network (2).

16. Redundancy manager in accordance with claim 13, 14 or 15, characterized in that it can be connected via at least two segment couplers (7, 9) to at least two communication channels (3, 4) of a higher-ranking redundant network (2) and that it is embodied to monitor the functionality of the segment couplers (7, 9) and depending on this, to select one of the segment couplers (7, 9) for connection to the network (11).

17. Method for operating a network (11), especially a PROFIBUS PA network, with redundancy properties, with the topology of the network (11) featuring a line (H1...H5) and the two line ends (E1, E2) being connected to a redundancy manager (RM)

which is embodied, in the error-free case, to disconnect the two line ends (E1, E2) from each other and in the event of an error to connect the two line end (E1, E2) to each other, characterized in that a feed voltage for operating user devices (F1...F4) connected by redundancy manager (RM) to the network (11) is injected into one of the line ends (E1, E2), that each branching unit (T1...T4) after receiving a feed voltage at one of its network connections (NW1) checks the state of the cable (H2) connected in each case to the other network connection (NW2) and only forwards the feed voltage for an error-free state of this cable (H2), and that the redundancy manager (RM) also injects a feed voltage into the other of the line ends (E1, E2) if at least predetermined time after injection of the feed voltage into the one line end no feed voltage is detected at the other line end by the redundancy manager (RM).